

C I V I L A E R O N A U T I C S B O A R D
ACCIDENT INVESTIGATION REPORT

Adopted: March 16, 1954

Released: March 19, 1954

AMERICAN AIRLINES, INC., NEAR ALBANY, NEW YORK, SEPTEMBER 16, 1953

The Accident

An American Airlines' Convair 240, N 94255, struck two of three radio towers located 3.1 miles southwest of the Albany Municipal Airport, Albany, New York, and crashed at approximately 0834^{1/} September 16, 1953. The aircraft was executing an approach to the airport when the accident occurred. All three crew members and 25 passengers on board were killed; the aircraft was destroyed by impact and fire.

History of the Flight

American Airlines' Flight 723 of September 16, 1953, was a scheduled operation between Boston, Massachusetts, and Chicago, Illinois, with intermediate stops among which were Hartford, Connecticut, and Albany, New York.

The crew consisted of Captain J. W. Stentz, First Officer W. J. Schanken, and Stewardess J. G. Thorquist. Prior to departing Boston the crew filed a company VFR (Visual Flight Rules) flight plan to Chicago following which the company issued a flight clearance to proceed to Albany INSTOP (Instrument or On Top of Clouds Authorized)^{2/} with an intermediate landing at Bradley Field, the airport serving Hartford, Connecticut, and Springfield, Massachusetts. The alternate airport was Syracuse, New York.

At the time this flight clearance was issued, the weather en route to Albany was good and the conditions at Albany were above minimums. The portion of the flight to Bradley Field was without incident and the aircraft arrived there at 0657.

At Bradley Field Captain Stentz reviewed the latest weather reports in the company's operations office and was advised that Bradley Field had been added to his flight clearance as a second alternate in addition to Syracuse because the weather at Albany at this time was below the company's landing minimums^{3/} but was forecast to improve to within limits by the time the flight

^{1/} All times referred to herein are based on the 24-hour clock and are Eastern Standard Time.

^{2/} With this type of clearance and since the flight was to be made by means of Visual Flight Rules (VFR), it was not necessary to file a flight plan with Air Route Traffic Control.

^{3/} The company's ceiling and Visibility Instrument Landing minimums at Albany, N. Y., for Convair aircraft are: Regular Straight-in landing Runway 19 - ceiling 400 feet, visibility one mile, day or night. Other approaches to Runway 19 or all other runways - ceiling 600 feet, visibility one mile day and night.

arrived there. The special Albany 0642 weather report available to the captain at this time was: ceiling indefinite zero, sky obscured, visibility zero, fog. The en route weather was clear.

According to the company's records, the gross takeoff weight of the aircraft at Hartford was 37,889 pounds which was within the allowable gross takeoff weight of 40,503 pounds; the load was properly distributed with respect to the center of gravity limits of the aircraft.

Departure from Bradley Field was made at 0714 with 25 passengers. Immediately before departing, the flight advised the tower it was proceeding to Albany VFR. At 0737, a message from the company's dispatcher at New York was relayed to Captain Stentz through the company radio at Albany as follows: "If Albany still below limits on your arrival, if OK with you, suggest hold vicinity until at least 0830 EST. Expect Albany to have limits 0730-0800 EST. Advise fuel on board when over Albany." Flight 723 acknowledged and advised, "We will hold." At 0740, the flight reported to Albany Approach Control that it was over Montgomery Ward, an in-range visual check point, VFR, and requested a clearance of at least 500 feet on top of clouds to the Albany Range Station. This request was approved and the flight was cleared to maintain at least 500 feet on top and to hold north of the Range Station. The 0739 Albany special weather report was given the flight: "Ceiling indefinite, 100 feet, sky obscured, visibility 1/4 mile, fog, wind west-southwest one mile per hour." Flight 723 reported over the Range Station at 0742. During the holding period the number of aircraft in this pattern varied from six to nine.

The special Albany weather report issued at 0750 indicated thin obscurement, ceiling estimated 4,000, overcast, fog, visibility 3/4 miles. At 0753, the first of the aircraft in the holding pattern, American Airlines' Flight 750, was cleared for an instrument approach to Runway 19. At 0800, this aircraft missed its approach and was immediately cleared to climb toward the south and to again remain at least 500 feet on top of clouds. A second aircraft which was holding was then cleared to make a similar approach and it too was forced to execute a missed approach procedure. At 0816, an instrument approach and a landing on Runway 19 were successfully completed by one of the holding aircraft.

Immediately following this landing, Flight 723 was cleared to make an instrument approach to Runway 19. Three minutes later the flight advised the tower that its approach was being abandoned because the aircraft's flaps could not be lowered. It was then still at least 500 feet on top of clouds and was advised by the tower to remain there until further advised. At approximately 0830, the following message was transmitted from the Albany Tower: "All aircraft holding Albany. It now appears to be pretty good for a contact approach from the west. It looks much better than to the north."

Immediately following this message, Flight 723 was asked by the tower if it would accept a contact approach from the west for a landing on Runway 10. After requesting and receiving current weather including altimeter setting (29.74) and the length of Runway 10 (4,500 feet), the flight stated it would accept a contact approach. Clearance was then issued the flight to make a contact approach to Runway 10. Acknowledgment of this clearance was the last radio contact with the flight. At approximately 0834, Flight 723 struck the radio towers and crashed.

The weather reported at the time of the accident was thin scattered clouds at 500 feet, ceiling estimated 4,500 feet, broken clouds, visibility 1-1/2 miles, fog.

Investigation

Investigation revealed that the right wing of the aircraft struck the center tower of three radio towers of Station WPTR at a point 308 feet above ground followed immediately by the left wing striking the end (easterly) tower 293 feet above ground. These towers, located 3.1 miles southwest of the airport, are spaced in a line 266 feet apart on a true bearing of 234 degrees with their tops 370 feet above the ground and about 690 feet above sea level.

Seven feet of the outer panel of the right wing including the right aileron and control mechanism from the center hinge outboard together with 15 feet of the left outer wing panel and aileron separated from the aircraft at this time. Following the collision with the towers, ground impact occurred a distance of 1,590 feet beyond and on a true bearing of 52 degrees from the tower last struck. First ground contact was made simultaneously by the nose and the left wing with the aircraft partially inverted. Impact forces and the ensuing fire destroyed the major portion of the aircraft.

Both engines separated from the aircraft at impact and were found adjacent to the main wreckage. The exterior of the left engine showed heavy impact damage to cylinders 8 through 15. The lower halves of the intermediate and rear accessory sections of this engine were missing. Other components of the engine suffered impact and fire damage.

The right engine was more extensively damaged than the left engine with approximately two-thirds of its rear accessory section destroyed by fire. Both engines were visually inspected at the scene of the accident and then shipped to the American Airlines' Maintenance Base at Tulsa, Oklahoma, for a complete tear-down inspection under the supervision of a Board investigator. Although these engines were severely damaged, no evidence was found from the parts examined to indicate that a mechanical failure occurred prior to ground impact.

All propeller blades were badly damaged. With one exception, all blades were broken free, however, their shank ends remained in the barrels. Upon removal of each propeller dome an examination indicated that the dome settings were approximately plus 29 degrees at impact; this setting is the full low pitch position.

The landing gear control handle attached to the locking quadrant was found in the "down locked" position. Inspection of the landing gear revealed that it was down and locked at impact.

There was no indication of fire having occurred in flight. All four CO₂ cylinders were recovered. The valve of one was broken at impact and the cylinder discharged; the others were fully charged.

It was determined that the flaps were in the "full up" position at impact. The wing flap selector valve and electrical solenoid showed a minimum of external damage. Examination of the solenoid assembly disclosed that the plunger shaft between the selector valve and solenoid had failed due to fatigue at approximately the last thread at the attach end to the solenoid. This type of failure would

not permit the pilot to lower the flaps and the flap selector valve could not be positioned manually from the cockpit.

Examination of the air frame and associated systems not destroyed by impact or fire disclosed no evidence of structural failure having occurred prior to impact other than failure of the flap mechanism.

All instruments were severely damaged. The barometric setting knobs of both the captain's and first officer's altimeters were broken off and the instruments damaged. The barometric scale of the former read 29.45 inches and that of the latter 29.76 inches.

It was determined that at the time of the accident there was sufficient fuel on board for the aircraft to have flown to either of its alternates with the required reserve.

The radio control panels were so damaged that a determination of precise frequency settings was impossible. However, by comparing the indicated settings with the positioning of the component parts, estimated settings were determined as follows:

ADF Receivers - One ADF receiver was set at 209 kilocycles; the other at 220 kilocycles. The frequencies of the Albany ILS compass locators for the middle and outer markers are 201 and 219 kilocycles respectively.

Low Frequency Range Receiver - By approximating the position of the tuning condenser, it was determined that this receiver was positioned at approximately 260 kilocycles. The volume control was in the "off" position. The frequency of the Albany Range Station is 263 kilocycles.

HF Communications Unit - This unit was set to 5476.5 kcs. This is the company "Day" frequency for the route.

VHF Communications Unit - This unit was set to approximately 118.5 mc. The Albany Tower transmits on and guards 118.7 mc.

VHF Navigation Receiver - This unit was tuned to 116.9 mc. The frequency of the Albany VOR is 116.9 mc.

Omni Bearing Selector - This selector was set to 99 degrees. The bearing of the desired runway was 100 degrees and the VOR Station was located near the intersection of this runway and the north/south runway.

No evidence was found to indicate a failure or malfunction of any of the aircraft's radio-communication or radio-navigation equipment prior to impact.

All CAA navigation and landing facilities for Albany were immediately checked and found to have been functioning properly when the accident occurred.

The subject radio towers were erected in 1948 with the approval of the CAA and the Federal Communications Commission. All three towers were hazard-painted and lighted in accordance with accepted standards. The lighting system included a light-sensitive device to assure automatic operation during periods of restricted visibility. These lights were on at the time of the accident.

Company personnel stated that Captain Stentz was a well-qualified Convair pilot, had made many landings on the Albany Airport, was thoroughly familiar with the surrounding terrain, and knew the height of the WPTR radio towers and their location with relation to the airport.

Runway 19 is 5,000 feet long and is used when a straight-in approach is to be made using the low frequency range. The straight-in approach to this runway or its reciprocal, Runway 1, is over relatively flat terrain. Runway 19 is also aligned with the Instrument Landing System. Although ILS was in operation this date, it had only been approved by the CAA a short time prior to September 16 and Captain Stentz had not received his company's authorization to use it.

Runway 10 is 500 feet shorter than Runway 19 and its approach is over irregular terrain. The elevation of the airport is 288 feet above sea level.

According to qualified witnesses the Convair 240 can be landed on Runway 10, without flaps and under similar conditions of load, surface wind, density altitude, and runway slope. Also, these aircraft can be stopped within 3,500 feet of runway distance provided both brake pressure and reverse propeller thrust are applied.

On the morning of September 16, a low pressure area dominated the New England states and a stationary front extended along the coast from New Jersey to Rhode Island. A small pressure wave was developing in this front and was causing a variable cloud cover over the New England states accompanied by some shower activity. Areas of clear sky over moist surface air produced sufficient cooling during the night that local conditions of ground fog and low stratus clouds developed.

At the time Flight 723 was making its approach, Albany Airport and the immediate surrounding terrain were partially covered by patches of fog and low stratus clouds. The base of these clouds was reported to be 500 feet above the ground and the tops at 1,000 to 1,200 feet.

Above this condition at an altitude of approximately 4,500 feet, there was another layer of broken clouds. Between these two cloud layers, the weather was clear and the visibility was good. Due to the effect of warming by the sun's rays, surface conditions were improving causing varying conditions of obscurement with a general improvement occurring in the entire western sector. The surface visibility at the airport was reported to be one and one-half miles.

In an effort to determine as accurately as possible the flight path of the aircraft during its approach, many persons were interviewed. From statements of those persons who were considered to have actually seen or heard the aircraft, it was determined that the approximate following pattern was flown: The aircraft was first observed approximately one-half mile west of the airport on a southerly heading flying at about 2,000 feet. Near the south boundary of the airport it turned right toward the west and disappeared into or above a fog bank. It is believed that after flying this direction a short time, the aircraft again flew toward the south. This direction was held for a few miles, after which a wide circular right turn was begun and terminated on a heading slightly south of east. This latter heading was continued until the aircraft collided with the radio masts.

While in the circular right turn, the aircraft flew over the eastern side

of the Voorheesville Army Depot located approximately 11 miles southwest of the airport. At this point the aircraft was observed by witnesses on the ground to be flying at a low altitude and one witness saw its landing gear extend. These witnesses stated that they could distinctly hear the noise made by the aircraft's engines and that they appeared to be functioning normally. Ground visibility in this area was approximately three miles limited by haze and fog and there appeared to be a dense fog to the northeast in the direction of the airport. Witnesses who were closer to the radio towers said that when they saw it, the aircraft was flying very close to the tree tops and only appeared between patches of fog. Several witnesses in this area said that the aircraft appeared to be "rocking" from side to side and that the engines sounded as though they were "sputtering." The fog in this area (near the towers) was quite dense and ground visibility was poor. A witness who did not see the aircraft hit the towers but did see it fall to the ground said that the upper one-third of the towers was completely obscured by fog. A sound believed to be a surge of engine power was heard immediately prior to the crash.

Analysis

Several factors had to be considered by Captain Stentz at the time he decided to execute a contact approach to Runway 10. The result of these considerations could have been the basis for his decision, and also could have had a decided bearing on the manner in which the approach was executed. It is advisable to review some of these factors.

When Flight 723 arrived at Albany, it was necessary because of a low ceiling and restricted visibility to hold, together with a number of other aircraft, at least 500 feet on top of clouds north of the Albany Range Station. Weather conditions were changing rapidly and were expected to improve sufficiently in a short time to permit landings. A few minutes after the flight entered the holding pattern, two of the aircraft were cleared, in turn, to make standard instrument approaches to Runway 19. Both of these aircraft, however, executed missed approaches because they were unable to establish visual reference with the ground within their authorized minimums. A third flight, however, made a landing, whereupon Flight 723 was cleared to make the same type of approach. This was abandoned because the wing flaps could not be extended and since the flight was still 500 feet on top, it continued in the No. 1 position in the holding pattern.

Approximately 10 minutes after abandoning the instrument approach, Flight 723 was informed by the tower that the weather was clearing to the west and was asked if it would accept a contact approach to Runway 10 from that direction. After requesting and receiving current weather, altimeter setting, and length of Runway 10 Captain Stentz replied in the affirmative. His specific request for the length of this runway was undoubtedly made to ascertain if it was of sufficient length for the flaps-up landing, with its attendant higher approach speed and additional landing roll. His acceptance of this runway indicated that he was fully satisfied that a safe landing could be made.

At the time Captain Stentz accepted this contact approach, it appears to have been a reasonable decision; the weather was clearing to the west of the airport and the bases of the scattered clouds were reported at 500 feet. Why the captain decided, in executing the approach, to fly in a general southerly direction and then make a wide right hand turn to align with the runway is not known. It is entirely possible that from his position in the holding pattern, the weather in that area appeared to be better.

The course which the pilot chose carried the flight into intermittent areas of fog and haze. Confronted with these conditions the captain should have pulled up and discontinued the approach, however, he flew the aircraft at an extremely low altitude probably in an effort to maintain or regain visual flight and to be able to touch down as near the approach end of the runway as possible.

Rolling turns were made along the flight path in an apparent effort to enhance forward visibility. Undoubtedly it was the execution of these turns which caused ground witnesses to say the aircraft was rocking from side to side.

The fact that the aircraft's omni bearing selector was set to 99° indicates that this instrument might have been used during portions of the approach as a check for runway alignment. However, it is apparent that during the latter portion of the approach the aircraft was flying so low that the crew could not have devoted much of their attention within the cockpit.

Because of these conditions it is probable that the aircraft continued the wide right turn past the desired heading to the runway and onto a heading which resulted in collision with the towers. The engine sound which witnesses described as a surge of power immediately prior to the collision may have been a sudden application of throttle by the pilot in an effort to avoid the towers. It is also possible that witnesses misinterpreted this sound because none were familiar with aircraft, engine, and propeller noises at low altitudes.

The Board views with concern the practice of some aircraft operators of making contact approaches to airports during very poor weather. It is intended that this matter be investigated further to determine whether some limitations upon contact approaches should be made in Part 60 of the Civil Air Regulations. A contact approach is made as an alternative to the instrument approach specified by the Administrator in order to expedite the flow of traffic. The need for some such alternative approach procedures, particularly in areas of high traffic density, is recognized. However, the Board is considering whether such alternative approach procedures should be explicitly specified by the Administrator and adhered to by all pilots under weather conditions less than the minimums specified for VFR approach and landing.

Findings

On the basis of all known evidence, the Board finds that:

1. The carrier, the aircraft and the crew were currently certificated.
2. The aircraft was loaded to a weight less than its maximum allowable and its center of gravity was located within prescribed limits.
3. Upon arrival of the flight, Albany weather was below authorized landing minimums and the aircraft was required to hold.
4. A standard instrument approach was started and later abandoned because of mechanical failure of the wing flap mechanism.
5. A contact approach to Runway 10 was later accepted because improved weather, especially to the west of the airport, made this runway most feasible.
6. The aircraft made a wide right turn southwest of the airport to align with Runway 10.

7. The latter part of the approach was at low altitude through weather conditions which prevented adequate visual reference.

8. Under existing conditions the pilot should have abandoned the approach.

9. The aircraft struck radio towers, the upper portions of which were obscured by fog.

10. These towers were hazard-painted and lighted in accordance with accepted standards.

11. All CAA navigational and landing facilities were functioning properly.

12. No evidence was found in the residual wreckage not destroyed by impact or fire to indicate that structural or mechanical failure occurred prior to impact other than to the wing flap mechanism.

Probable Cause

The Board determines that the probable cause of this accident was that during the execution of a contact approach, and while maneuvering for alignment with the runway to be used, descent was made to an altitude below obstructions partially obscured by fog in a local area of restricted visibility.

BY THE CIVIL AERONAUTICS BOARD:

/s/ CHAN GURNEY
/s/ HARMAR D. DENNY
/s/ OSWALD RYAN
/s/ JOSH LEE
/s/ JOSEPH P. ADAMS

S U P P L E M E N T A L D A T A

Investigation and Hearing

The Civil Aeronautics Board was notified of this accident at 0920 September 16, 1953, by the New York Civil Aeronautics Administration regional office. An investigation was immediately initiated in accordance with the provisions of Section 702 (a)(2) of the Civil Aeronautics Act of 1938, as amended. A public hearing was ordered by the Board and was held in Albany, New York, on October 13 and 14, 1953.

Air Carrier

American Airlines, Inc., is a scheduled air carrier incorporated in the State of Delaware with its principal office in New York, New York. It operates under a currently effective certificate of public convenience and necessity issued by the Civil Aeronautics Board and an air carrier operating certificate issued by the Civil Aeronautics Administration. These certificates authorize the company to transport by air, persons, property, and mail between various points in the United States, Mexico, and Canada, including the route between Boston, Massachusetts, and Chicago, Illinois.

Flight Personnel

Captain James W. Stentz, age 32, held a currently effective airline transport certificate with an appropriate rating for the subject aircraft. He was employed by the company March 8, 1943. He had a total of 7,500 flying hours of which 2,000 were in Convair 240 type aircraft. His last instrument check was accomplished May 19, 1953. His last CAA physical examination was taken March 30, 1953.

First Officer W. J. Schanken, age 32, held a currently effective airman certificate with commercial pilot and instrument ratings. He was employed by the company May 13, 1953. He had a total of 1,400 flying hours of which 215 were in Convair 240 type aircraft. His last CAA physical examination was accomplished November 15, 1952.

Stewardess Janice Gale Thorngquist, age 24, was employed by the company July 7, 1953.

The Aircraft

N 94255, a Convair 240 aircraft, was manufactured November 1, 1948. It had a total of approximately 9,920 flying hours at the time of the accident and was currently certificated by the Civil Aeronautics Administration. The aircraft was equipped with two Pratt & Whitney R-2800-83AM4A engines and Hamilton Standard propellers.